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A Q-Band Pulsed ENDOR Spectrometer for the Study of Transition Metal Ion Complexes in Solids

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Abstract

We describe the design of a pulsed electron nuclear double resonance (ENDOR) spectrometer operating at Q-band frequencies (35 GHz) for studies of transition metal ion complexes in the temperature range between 4.2 and 297 K. Specific features of the spectrometer are a microwave IMPATT generator, a homebuilt cavity, and a commercial Bruker magnet. Standard Davies and Mims ENDOR sequences have been implemented. The performance of the spectrometer is demonstrated for a broad radio frequency range by 1H, 14N, 31P, 133Cs, and 207Pb pulsed ENDOR experiments of Cu 2+, Cr 5+, and V 4+ transition metal ion complexes in both single crystals and disordered materials.